SAFETY BRIEF
AOPA AIR SAFETY FOUNDATION
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WARP
Weather and Radar Processor

Advanced weather radar displays are available to air traffic controllers, and pilots are using this capability by asking for ATC's help in avoiding severe weather. Unfortunately, there's been a dramatic upswing in thunderstorm-related accidents, even when pilots are talking to ATC. This Safety Brief updates pilots on new weather radar terminology, ATC weather radar equipment, procedures, and the importance of understanding what thunderstorm avoidance services are—or aren't—being provided.

Basics

The Weather and Radar Processor, or WARP, is used in all Air Route Traffic Control Centers (ARTCCs, or Centers) to provide weather radar information to controllers and pilots. WARP works by overlaying data from multiple NEXRAD sites on a controller's scope. WARP displays precipitation in three levels: moderate, heavy and extreme. This differs from the six levels of precipitation that pilots are used to seeing on the evening news or on aviation weather Web sites.

New Terminology

Before January 2006, controllers used the terms moderate, heavy and *heavy* to describe the three precipitation levels shown by WARP. Now, controllers describe the precipitation levels as moderate, heavy and extreme. This change allows pilots to distinguish between heavy and extreme precipitation when talking with Center controllers.

Why the Change?

A rash of accidents brought about this change in terminology. According to the 2005 ASF Nall Report, nearly 25 percent of fatal weather-related accidents in 2004 were due to encounters with thunderstorms. All pilots involved in these accidents were in contact with ATC, but still flew into severe conditions. These accidents highlight the importance of pilots and controllers sharing an understanding of which thunderstorm avoidance services are, or are not, being provided.

WARP

There's more to WARP than pretty colors on a controller's scope. Like most technology, WARP has some limitations. Because WARP compiles information from more than one NEXRAD site before overlaying it on a controller's scope, the radar data is six to eleven minutes old. When convective activity is building quickly, this time lag may make the information provided by WARP severely outdated.

Also, WARP does not display light precipitation. What would be shown as Level 1 precipitation by a NEXRAD radar display will not be depicted by WARP, leaving "moderate" precipitation as the lowest level shown.

Center controllers using WARP

WARP does not display the tops of precipitation. In order to get this information, controllers must extrapolate some of what they see on their scope: Are pilots deviating around an area where no precipitation is being displayed? Are they asking for altitude changes due to weather or turbulence, or relaying pireps that include light precipitation? What WARP does show is precipitation by altitude blocks. Controllers can set their scopes to show precipitation from the surface to FL 240, FL 240 to FL 330 and FL 330 to FL 600. These large altitude blocks mean determining the height of an area of precipitation can be challenging at best. For those of us who remember when ATC had little or no weather information, however, WARP—even with its limitations—is a great improvement.

Radar Review

Radar measures precipitation only. It's not a detector of instrument meteorological conditions (IMC), or turbulence. It's a precipitation detector only, and it has some limitations.

Radar works through line of sight, and this causes some problems. For example, radar has a limited coverage area at the altitudes most general aviation aircraft fly, as well as in mountainous areas. And while radar is a great tool, it may not display every drop of precipitation for a given area. This limitation is compounded by WARP because it does not display light precipitation. The lowest level of precipitation that WARP shows is moderate (Level 2). For many light general aviation aircraft, moderate precipitation can provide a challenging flight environment.

Pilot and Controller Responsibilities

Controllers can provide a description of weather that includes intensity, location and size. For example, ATC may say "Moderate weather areas between six o'clock and ten o'clock, three zero miles. Weather area is five zero miles in diameter." This description does not include the direction of the precipitation's movement, which may be helpful when requesting a deviation (or deciding to land).

Pilots must request a deviation based on the information that ATC has provided. For example, "Request heading two four zero for ten miles for weather." While a pilot can query ATC for additional information to help make a good decision, it's his or her responsibility to ask for a deviation.

Contrary to the expectations of some pilots, providing vectors around thunderstorms is not ATC's primary job. Providing weather information is done on a workload-permitting basis. Generally, as the weather deteriorates, ATC's workload goes up. In these situations, pay close attention to what other aircraft are doing: Are they deviating around cells or climbing to get over weather? Not all weather information has to come directly from ATC.

Avoid Confusion

To help avoid thunderstorms and miscommunication with ATC:

- Ask for deviations early. This will keep options open as weather develops.
- Let ATC know if you don't have on-board radar equipment; you're relying on them for weather radar updates.
- Confirm the services you are receiving from each controller.
- If you're unsure about any ATC communication, clarify the meaning with the controller.

Resources

To help pilots understand how miscommunications between pilots and ATC can cause accidents, the AOPA Air Safety Foundation has developed a free online course. Thunderstorms: A Case Study is located at http://www.aopa.org/safetycenter/courses/trw/. This five-minute course emphasizes the importance of understanding exactly what radar services are being provided. Actual ATC audio of a pilot who strayed into 'extreme' precipitation demonstrates how dangerous misunderstandings can be.

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